

We claim:

1. An underwater torch for cutting and welding comprising:

A) a motor having a movable shaft;

B) an electrode which is connected to said shaft, said electrode being comprised of composition with an empirical formula $MB_{2-z} + N$, wherein $0 < z < 0.10$ and M is selected from the group consisting of Zr, Hf and Ti, wherein N is selected from a group consisting of Cu, Au and Ag and wherein the MB_{2-z} defines a ceramic structure formed with ceramic and defining a volume with void spaces comprising at least 10 percent of the volume of the matrix structure and the N occupies a portion of the void spaces.

C) an electrically conductive means fitted around at least a portion of said electrode and through which conductive means electric current is conducted from an external power supply source to said electrode.

2. The torch as in Claim 1 wherein the MB_{2-z} portion of the composition comprises elongated components.

3. The torch as in Claim 2 wherein said elongated components are fibers.

4. The torch as in Claim 2 wherein said elongated components are wire fragments.

5. The torch as in Claim 2 wherein said elongated components are elongated grains.

6. The torch as in Claim 2 wherein said elongated components are oriented radially.

7. The torch as in Claim 2 wherein said elongated components are oriented randomly.

8. The torch as in Claim 1 wherein M is Zr.

9. The torch as in Claim 1 wherein M includes Zr and Hf.

10. The torch as in Claim 1 wherein M includes Zr and Ti.

11. The torch as in Claim 1 wherein M is Hf.

12. The torch as in Claim 1 wherein M is Ti.

13. The torch as in Claim 1 wherein z is about 0.07.

14. The torch as in Claim 1 wherein N is copper.

15. The torch as in Claim 1 wherein said void spaces comprise at least 30 percent of the volume of said matrix.

16. The torch as in Claim 1 wherein said movable shaft is a rotating shaft.

17. The torch as in Claim 16 wherein said electrode is rod shaped.

18. The torch as in Claim 16 wherein said electrode is disc shaped.
- 19 The torch as in Claim 1 wherein said movable shaft is a reciprocating shaft.
20. The torch as in Claim 13, wherein said void spaces comprise about 32 percent of the volume of said matrix.
21. The torch as in claim 14 wherein said void spaces comprise at least 32 percent of the volume of said matrix and the Cu occupies at least 95 percent of the void space.
22. The torch as in Claim 1 wherein said electrode is a consumable electrode.
23. An apparatus for underwater torch cutting and welding comprising a body having at least a first chamber and a second chamber; a hydraulic motor fitted in said first chamber and communicating with an external source of a pressurized liquid medium, said motor having a movable shaft; an electrode which is connected to said shaft, and at least a portion of said electrode being adapted to extend out of said body through an opening in said body; electrically conductive means fitted in said second chamber around at least a portion of said electrode and through which conductive means electric current is conducted from an external power supply source to said electrode, said apparatus comprising means for cutting into a work piece by means of said elongated electrode and for moving said electrode in a desired path along the work piece to make a cutting of a desired shape; and means for communicating said first chamber with said external source of a pressurized liquid medium; wherein said electrode is comprised of composition with an empirical formula $MB_{2-z} + N$, wherein $0 < z < 0.10$ and M is selected from the group consisting of Zr, Hf and Ti, wherein N is selected from a group consisting of Cu, Au and Ag and wherein the MB_{2-z} defines a ceramic structure formed with ceramic and defining a volume with void spaces comprising at least 10 percent of the volume of the matrix structure and the N occupies a portion of the void spaces.
24. An apparatus as claimed in Claim 23 further comprising means defining a passageway from said first chamber through said second chamber and through said opening in said body through which said electrode also extends, whereby said liquid medium is received into said first chamber for powering said hydraulic motor and is communicated along said electrode and discharged from said apparatus through said opening in said body through which said electrode extends.

25. A method of underwater torch cutting by means of an apparatus comprising:
- A) a motor having a movable shaft;
 - B) an elongated electrode, comprised of composition with an empirical formula $MB_{2-z} + N$, wherein $0 < z < 0.10$ and M is selected from the group consisting of Zr, Hf and Ti, wherein N is selected from a group consisting of Cu, Au and Ag and wherein the MB_{2-z} defines a ceramic structure formed with ceramic and defining a volume with void spaces comprising at least 10 percent of the volume of the matrix structure and the N occupies a portion of the void spaces one end of which is connected to said shaft,
 - C) an electrically conductive means fitted in said second chamber around at least a portion of said electrode and through which conductive means electric current is conducted from an external power supply source to said electrode, the method comprising the steps of:
 - a) connecting said conductive means to said external power supply source; and
 - b) cutting into a work piece by means of said elongated electrode and moving said electrode in a desired path along the work piece to make a cutting of a desired shape.